

**Authorization Basis Amendment Request (ABAR), ABAR-W375-00-00014, Rev. 0
Part A Hazard Analysis Report (HAR) Significant and Bounding Hazard Evaluation &
Initial Safety Analysis Report (ISAR) Fundamental Aspects of Design**

Supplemental Information

Background

BNFL Inc. prepared authorization basis amendment request (ABAR) ABAR-W375-00-00014, Revision 0, as part of the effort to align the authorization basis with the design that was submitted as part of the April 24, 2000, BNFL contract deliverable. The ABAR was submitted for review and approval by the Regulatory Unit (RU) in the Reference 1 letter. A second transmittal (Reference 2) was made that provided errata pages to the ABAR. The ABAR made changes to both fundamental aspects of design as addressed in the Initial Safety Analysis Report (ISAR) and significant and bounding hazards addressed in the Part A Hazards Analysis Report (HAR).

The RU completed the review of the ABAR and concluded that the ABAR did not provide sufficient information to allow them to approve the fundamental aspects of design portion of the ABAR. Consequently, only the significant and bounding hazards portion of the ABAR was approved by the RU in Reference 3.

The ABAR identified two changes to the fundamental aspects of design that, because they drove changes to the bounding and significant hazards contained in the HAR, constituted reductions in commitment in the AB because they impacted the bounding and significant hazards in the HAR and required RU approval prior to implementing the changes. The RU identified a third change that they believe requires RU approval prior to implementation in their safety evaluation transmitted in Reference 3. These changes in design are:

1. Add six LAW feed receipt vessels to the pretreatment building
2. Provide treatment and temporary storage of HLW solids
3. Separation of the process building into separate buildings with specific process functions.

This evaluation provides the information noted as missing in the original ABAR to allow the RU to approve the fundamental aspects of design portion of the ABAR.

Evaluation

Add Six LAW Feed Receipt Vessels to the Pretreatment Building

An engineering trade study demonstrated that planned upgrades to the 241-AP-106 tank would not be adequate to meet LAW feed requirements for the pretreatment facility. Contract changes have changed the processing flow to eliminate operation of the AP-106 tank from the BNFL scope. This change added LAW receipt and holdup and process equipment to the design.

In general, the change consists of the addition of six, 250,000 gallon storage vessels to the pretreatment facility. The main radiological hazards associated with this change are:

1. Direct radiation from vessels / pipework
2. Leaks and spills of radioactive material that could enter the workplace or environment, and
3. Accumulation of hydrogen in the vessels resulting in a potential explosive hazard.

These hazards have been evaluated through the integrated safety management (ISM) process and the following controls have been placed on the facility:

1. The LAW feed receipt vessels will be located in a cell which will provide both radiation shielding and confinement functions.
2. The cell will be ventilated by the C5 exhaust system. In addition, the airflow into the cell will be from areas of lesser contamination and then exhausted through the C5 exhaust system. These will assure that any airborne contamination does not inadvertently migrate into occupied areas of the RPP-WTP and will be filtered to acceptable limits prior to discharge to the environment.
3. The LAW feed receipt vessels will be high quality vessels providing for containment throughout the expected life of the vessels.
4. The LAW feed receipt vessels will be ventilated by the process vessel vent system (PVVS) to ensure that there is sufficient air flow to maintain the hydrogen concentration below flammable limits.

The LAW feed receipt vessels, the confinement and filtration functions of the C5 system, PVVS and cell housing the feed receipt vessels are preliminarily classified as seismic category I, safety design class (SDC) systems, structures, and components (SSC). This classification is preliminary and will be confirmed by the design basis event analysis, which is part of the ISM process and will be documented in the preliminary safety analysis report (PSAR). In addition, codes and standards that will be applied to these SSCs will be confirmed prior to submittal of the PSAR.

Provide Treatment and Temporary Storage of HLW Solids

Contract changes have changed the processing flow to require treatment and storage of the solids. The change added process treatment equipment and solids storage to the design. The treatment of HLW solids will consist of caustic washing that will occur in the ultrafiltration portions of the HLW pretreatment process. The solids will then be stored until such time as they are processed through the high level waste vitrification line.

In general, the change consists of the addition of the capability provide a caustic wash of the HLW solids and to store concentrated HLW solids in the HLW feed receipt vessels. The hazards associated with this change are:

1. Direct radiation from vessels / pipework
2. Leaks and spills of radioactive material that could enter the workplace or environment, and
3. Accumulation of hydrogen in the vessels resulting in a potential explosive hazard.
4. Episodic hydrogen releases following solids settling

These hazards have been evaluated through the integrated safety management (ISM) process and the following controls have been placed on the facility:

1. The HLW feed receipt vessels will be located in a cell, which will provide both radiation shielding and confinement, functions.
2. The cell will be ventilated by the C5 exhaust system. In addition, the airflow into the cell will be from areas of lesser contamination and then exhausted through the C5 exhaust system. These will assure that any airborne contamination does not inadvertently migrate into

occupied areas of the RPP-WTP and will be filtered to acceptable limits prior to discharge to the environment.

3. The HLW feed receipt vessels will be high quality vessels providing for containment throughout the expected life of the vessels.
4. The HLW feed receipt vessels will be ventilated by the process vessel vent system (PVVS) to ensure that there is sufficient air flow to maintain the hydrogen concentration below flammable limits.
5. Controls for episodic releases involve not permitting the solids to settle long enough to cause a problem. The actual method of implementation is still under review.

The HLW feed receipt vessels, the confinement and filtration functions of the C5 system, PVVS, the cell housing the feed receipt vessels, and means for solids agitation are preliminarily classified as seismic category I, safety design class (SDC) systems, structures, and components (SSC). This classification is preliminary and will be confirmed by the design basis event analysis, which is part of the ISM process and will be documented in the preliminary safety analysis report (PSAR). In addition, codes and standards that will be applied to these SSCs will be confirmed prior to submittal of the PSAR.

Separation of the Process Building into Separate Buildings with Specific Process Functions

During Part B-1 design development, the separation of the original single process plant into multiple process plants was made to maintain the processing schedule required by the DOE. The processing functions internal to the multiple process plants remained unchanged from that envisioned for the single process plant. The change to the hazards associated with the RPP-WTP due to this design change is primarily from the increased number of inter-facility material transfers that will be required. The hazards associated with this change are:

1. Direct radiation from an unshielded transfer line, and
2. Leaks and spills of radioactive material that could enter the environment.
3. Transferring incorrect material to a facility.

These hazards have been partially evaluated through the integrated safety management (ISM) process and the following controls have been placed on the facility:

1. The transfer lines will be buried to provide shielding from direct exposure.
2. The transfer lines will be coaxial lines provided with leak detection.
3. Controls on material specification prior to initiating transfer.

The transfer lines and procedures used for material controls prior to transfer are preliminarily classified as seismic category I, safety design class. This classification is preliminary and will be confirmed by the design basis event analysis, which is part of the ISM process and will be documented in the preliminary safety analysis report (PSAR). In addition, codes and standards that will be applied will be confirmed prior to submittal of the PSAR.

Conclusions

Based on the above discussion, BNFL believes that the changes can be implemented without adversely affecting the health and safety of the workers or public.

References

1. CCN 012864, Letter, A.J. Dobson, BNFL Inc., to D.C. Gibbs, DOE/RL, "Request to Amend Authorization Basis Regarding New or Changed Significant and Bounding Hazard Evaluations and Fundamental Aspects of Design," dated April 23, 2000.
2. CCN 013259, Letter, A.J. Dobson, BNFL Inc., to D.C. Gibbs, DOE/RL, "Errata to ABAR-W375-00-00014, Rev. 0, "Part A HAR Significant and Bounding Hazard Evaluations and ISAR Fundamental Aspects of Design," dated April 23, 2000," dated May 19, 2000.
3. CCN 014622, Letter, D.C. Gibbs, DOE/RL, to P.O. Strawbridge, BNFL Inc., "Regulatory Unit (RU) Approval of Authorization Basis Amendment Request (ABAR), ABAR-W375-00-00018, Revision 0, Clarification of Commitments in Integrated Safety Management Plan (ISMP)," 00-RU-0489, dated July 13, 2000.